Abstract

A TEST OF THE THEORETICAL MODELS OF BIPOLAR OUTFLOWS: The Bipolar Outflow in Mon R2

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We report some results of a study of the massive bipolar outflow in the central region of the relatively nearby giant molecular cloud Monoceros R2. We find in our CO J= 1-0 maps an "cggpla.llt-shaped", thin bipolar outflow shell which outlines the extended blue lobe of the bipolar outflow. The projected length and width of the shell are shout 5.3 pc and 2.7 pc respectively, and the averaged projected thickness of the shell is estimated to be 0.3 pc. The outflow shell's symmetry axis is estimated to be inclined by 70 degrees with respect to the line of sight. We make a quantitative comparison of our results with the Shu *et al.* outflow model which incorporates a radially directed wind sweeping up the ambient material into a shell. We find that this simple model naturally explains the shape of this thin shell. Although Shu's model in its simplest form predicts with reasonable parameters too much mass at very small polar angles, as previously pointed out by Masson and Chernin, it provides a reasonably good fit to the mass distribution at larger polar angles. It is possible that this discrepancy is due to inhomogeneities of the ambient molecular gas which is not considered by the model. We also discuss the constraints imposed by these results on recent jet-drivel) outflow models.